
ENVIRONMENTAL Fact Sheet



29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

WD-DWGB-21-4

2007

Best Management Practices for Well Drilling Operations

Background

Well construction methods include rotary drilling, cable tool drilling, percussion hammer, jetting, excavation, augering. These methods commonly include the use of heavy equipment, water, bentonite clay, and related byproducts. As a result, well drilling operations may generate solids, which are referred to as suspended solids when transported by water movement, or discharged directly to a wetland or surface water. When not properly contained, the generated solids may adversely impact wetlands and surface waters.

Suspended Solids

Suspended solids are considered a nonpoint source pollutant, often found as natural sand, silt and clay sediments. They are typically produced by earth disruption activities such as road construction and maintenance, timber harvesting, agricultural practices, mining, land development, and well drilling. The well drilling process uses and generates solids that may become suspended in water.

Suspended solids may impact surface waters and water-dependent organisms by:

- Increasing the natural aging of waterbodies, known as eutrophication. This process typically takes thousands of years to complete. Deposition of suspended solids speeds the aging process as water temperature and nutrient loading increase and water clarity and oxygen concentrations decrease.
- Increasing the transport of nutrients (nitrogen and phosphorus) that adhere to sediment particles to waterbodies. Increased nutrient loading to lakes encourages algae growth. Occasionally, algae growth may result in dramatic increases in algae populations, referred to as algal blooms.
- Increasing deposition of suspended solids can add sediments to a waterbody and can support the dominance of nuisance or exotic species.
- Interfering with recreational activities such as swimming and fishing.
- Causing murky conditions, reducing the ability for fish and other aquatic organisms to see their food, breathe and successfully reproduce.

Best Management Practices to Prevent Impacts of Suspended Solids to Wetlands and Surface Waters

Containment of well drilling operation: All well drilling operations should have the site contained during and after well installation. This includes having the ability to dig a containment pit on-site, adding a temporary well cap, installing hay bales and silt fencing and pumping overflow off site or to a poly-lined dumpster when necessary.

Well location: All wells should be constructed outside wetlands and surface waters as defined by DES. All permanent and temporary wetland or surface water impacts necessary for well construction require a DES Wetlands Bureau Dredge and Fill Permit.

Heavy equipment: All heavy equipment should stay outside surface waters and wetlands as defined by DES. If permanent or temporary surface water or wetland impacts are necessary for well construction a Wetlands Dredge and Fill Permit is required. Areas subject to earth disturbance should be contained with hay bales and silt fence if the potential to adversely impact wetlands or surface water exists.

Silt pit: During the well drilling process a silt pit is often necessary. If so, the silt pit should have a capacity to prevent overflow or discharge to uplands. The discharge should spread out to prevent channelizing of water possibly leading to erosion and possible adverse impacts to wetlands and surface waters. When this is not possible, pumping off-site is necessary.

Well drilling materials: Water and bentonite clay may be used during the well construction process. Disposed water should infiltrate in the ground without impacting wetlands and surface waters or channeling away from the well site. Bentonite clay must be contained on site, preferably in a pit to limit overland flow either during construction or following an event causing surface water run-off.

Well drilling byproducts: During the well drilling process, approximately 20 cubic feet of drilling byproducts is generated for every 100 feet of well depth. Often times this is a fine particle sized material referred to as stone dust. To meet DES water quality standards it is necessary to contain these byproducts on site and prevent them from moving into wetlands and surface waters.

Water Quality Standards

For a full description of DES Water Quality Standards see the New Hampshire Code of Administrative Rules, PART Env-Ws 1703. The list below includes two sections of the Water Quality Standards for surface waters, including wetlands, related to suspended solids and turbidity, often violated when well-drilling operations are not appropriately contained. All of the State's surface waters (lakes, ponds, rivers, streams, wetlands) are classified as either Class A or B pursuant to RSA-A:8, I, II and III.

Env-Ws 1703.03 General Water Quality Criteria

- a) The presence of pollutants in the surface waters shall not justify further introduction of pollutants from point and/or nonpoint sources.
- b) State surface waters shall retain their legislated classification even if they fail to meet any or all of the general, class specific, or toxic criteria contained in this part.

c) The following physical, chemical and biological criteria shall apply to all surface waters:

1. All surface waters shall be free from substances in kind or quantity that:
 - a. Settle to form harmful deposits;
 - b. Float as foam, debris, scum or other visible substances;
 - c. Produce odor, color, taste or turbidity which is not naturally occurring and would render it unsuitable for its designated uses;
 - d. Result in the dominance of nuisance specie; or
 - e. Interfere with recreational activities.

Env-Ws 1703.11 **Turbidity**

- a. Class A waters shall contain no turbidity, unless naturally occurring.
- b. Class B waters shall not exceed naturally occurring conditions by more than 10 nephelometric turbidity units (NTUs).

For Additional Information

Please contact the Drinking Water and Groundwater Bureau at (603) 271-2513 or dwgbinfo@des.state.nh.us or visit our website at www.des.nh.gov/dwgb. All of the bureau's fact sheets are on-line at www.des.nh.gov/dwg.htm.

Note: This fact sheet is accurate as of January 2007. Statutory or regulatory changes, or the availability of additional information after this date may render this information inaccurate or incomplete.